



$$\vec{F}_{net} = \vec{F}_s + \vec{F}_g + \vec{F} \quad (1)$$

$$m\ddot{x} = -kx + mg + F \quad (2)$$

$$\ddot{x} = -\omega_0^2 x + g + F/m \quad (3)$$

$$\ddot{x} + \omega_0^2 x = g + F/m \quad (4)$$